Mathematical and Statistical Estimation Approaches in Epidemiology

- Essential resource for graduate students interested in the analysis of infectious disease outbreaks and epidemic modeling
- Approaches for the estimation of the transmission potential of infectious diseases and other epidemiological parameters
- Methods and applications for sensitivity and uncertainty quantification in epidemic modelling
- Theory and methods are illustrated using real applications

Mathematical and Statistical Estimation Approaches in Epidemiology compiles theoretical and practical contributions of experts in the analysis of infectious disease epidemics in a single volume. Recent collections have focused in the analyses and simulation of deterministic and stochastic models whose aim is to identify and rank epidemiological and social mechanisms responsible for disease transmission. The contributions in this volume focus on the connections between models and disease data with emphasis on the application of mathematical and statistical approaches that quantify model and data uncertainty. The book is aimed at public health experts, applied mathematicians and scientists in the life and social sciences, particularly graduate or advanced undergraduate students, who are interested not only in building and connecting models to data but also in applying and developing methods that quantify uncertainty in the context of infectious diseases. Chowell and Brauer open this volume with an overview of the classical disease transmission models of Kermack-McKendrick including extensions that account for increased levels of epidemiological heterogeneity. Their theoretical tour is followed by the introduction of a simple methodology for the estimation of the basic reproduction number R. The use of this methodology is illustrated, using regional data for 1918–1919 and 1968 Influenza pandemics.